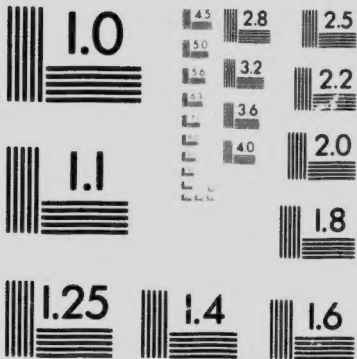


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LABORATORY

OF THE

INLAND REVENUE DEPARTMENT

OTTAWA, CANADA

BULLETIN No. 252

GROUND CLOVES

A STUDY.

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OF THE
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GROUND CLOVES
A STUDY.

OTTAWA, March 14, 1913.

WM. HIMSWORTH, Esq.,
Acting Deputy Minister, Inland Revenue.

SIR,—I have the honour to present you a report upon 141 samples of Ground Cloves. The samples were purchased by our Inspectors on the open market, throughout Canada, chiefly of retail grocers who are the usual purveyors of the article.

Cloves are found in the retail trade both in the unground and in the ground state. The form of this spice is so distinctive that, when sold in the unground condition it admits of no sophistication, except that it may have had its essential oil less removed by an extraction process. The demand for this oil (*Eugenol*) since the introduction of artificial vanillin is very considerable, and doubtless accounts for the large amount of exhausted cloves on the market.

We have made two extensive inspections of cloves in these laboratories. The first is reported in Bulletin 73 (October, 1900). This is chiefly a study of whole cloves, and was undertaken in consequence of complaints received from a reputable English house, concerning the importation of exhausted cloves into Canada. Nineteen samples of whole cloves and twenty-two of ground cloves were submitted to analysis; and the results were such as to demonstrate the need of defining limits, particularly as regards the content of volatile oil, for the legally genuine article.

The following conclusion was reached as a result of the work reported in Bulletin 73:—

‘No sample of Cloves claiming to be of good quality, should yield less than 14 per cent of volatile oil when assayed by the methods which are herein described. If total volatile matter is determined by treatment with petroleum ether, before drying at 98° C., the minimum volatile matter found should be at least 16 per cent by weight.’

38695—1½

The Committee upon Food Standards of the United States (Circ. 19, Department of Agriculture, Washington, June, 1906) recommends the following standards for Cloves:—

'The dried flower buds of *Caryophyllus Aromaticus*, which contain not more than 5 per cent of clove stems; not less than 10 per cent Volatile Ether Extract; not less than 12 per cent quercitannic acid; not more than 8 per cent total ash; not more than 0.5 per cent ash insoluble in hydrochloric acid; not more than 10 per cent crude fibre.'

The volatile Ether Extract mentioned in this definition is not strictly identical with volatile oil, for the reason that it is determined on the cloves after drying by a method which involves a considerable, and an unknown loss of volatile oil. The limit of 10 per cent for volatile Ether Extract named in the United States definition is certainly too low to apply to volatile oil.

In July and August of 1907, a collection of 145 samples of ground Cloves was made and is reported in Bulletin 173. It was found possible to classify only 52 per cent of this collection as undoubtedly genuine. On the other hand, the absence of legally established limits made it impossible to declare adulteration except in cases where foreign matters were present.

Although the work reported in Bulletins 73 and 173 furnishes material for a tentative scheme of assaying cloves, it was felt that some points needed further elucidation, and the present report is the result. The following conclusions seem to be justified as a study of the whole:—

1. The total ash of cloves, free from stems should not exceed 6 per cent.
2. Presence of stems considerably increases the Ash.
3. Ash insoluble in hydrochloric acid is very low in clove buds, not exceeding two or three-tenths of one per cent.
4. Addition of stems notably increases the acid-insoluble Ash.
5. The volatile oil of cloves is the most important character, and is at the same time the component which gives the spice its value as a condiment. Determination of volatile oil is complicated by the fact that any moisture (normally 6-7 p.c.) comes off with the oil; and attempts to dry the clove, necessarily result in loss of volatile oil.
6. The best way of drying cloves would appear to be the use of sulphuric acid in vacuo. The point at which the oil comes off in notable amount being indicated by discolouration of the acid.
7. The volatile oil of cloves should not be less than 14 per cent by weight of the cloves, and may reach 19 per cent.
8. The total volatile matter of cloves, consisting of water and volatile oil should not be less than 16 per cent, and may reach 25 per cent of the weight of the cloves.
9. The fixed oil of cloves, determined by extraction on the properly prepared sample should be about 10 per cent of the weight of the cloves, when estimated by loss. This component seems to be more variable than the others, and to be less affected by the commercial treatment of the clove for Eugenol.

On account of their high content in oil, manufacturers find it difficult (some say impossible) to grind cloves without addition of something to take up the excess of oil. For this purpose, Pimento (all-spice) seems the most in use; but clove-stems, and possibly certain starches, may be employed. The use of pimento, or other suitable matter, for such purpose does not constitute adulteration, provided that the article be sold as a compound or mixture. (R.S. 1906, Chap. 133, Sec. 24a).

Over one hundred samples of the present collection contain pimento, in amounts varying from a small percentage to apparently 30 or 40 per cent of the sample. This consideration with the fact that the cost of pimento is only about one-half the cost of the cloves, makes it evident that not only must the fact of admixture be

declared, but a statement of the amount of each ingredient as well, in order that the public be properly informed as to the article supplied.

If we accept as normal such samples as contain not less than 14 per cent of volatile oil, 78 samples of this collection will be classed as normal. Among these, however, there are great differences in quality as may be seen below:—

14 to 15 p.c. volatile oil in..	27 samples.
16 to 17 " "	19 "
18 to 19 " "	22 "
20 or more p.c. "	10 "

It would therefore appear reasonable to require a minimum of at least 14 per cent volatile oil for ground cloves. Many samples herein marked 'normal' exhibit large admixture of pimento starch; and since pimento contains from 3 to 6 per cent of Eugenol, it might be possible for a mixture of cloves having 20 per cent oil with pimento having 5 per cent oil, to contain 40 per cent of pimento and still yield 14 per cent of Essential Oil on analysis.

The following scheme of standards for Ground Cloves is suggested as consistent with the knowledge we possess of the commercial article:—

1. *Cloves*.—The flower-buds of *Caryophyllus Aromaticus*, L., containing not more than (5) per cent of Clove stems; dried but not otherwise treated.

2. *Ground Cloves*.—Cloves, reduced to powder by grinding, without addition of other matters; and possessing the following characters:—

	Per cent.
(a) Total ash, not exceeding..	8
(b) Sand, not exceeding..	0.5
(c) Moisture, not exceeding..	10
(d) Volatile Oil, not less than..	14
(e) Tannic Acid, not less than..	12
(f) Crude fibre, not more than..	10

3. *Ground Cloves, compound or mixture*.—Cloves reduced to powder by grinding, in admixture with not more than 50 per cent of a harmless substance or substances of a stated nature.

The work now recorded will form the basis of recommendations for standardization of this article with as little delay as possible.

I beg to recommend publication of this as Bulletin No. 252.

I have the honour to be, Sir,

Your Obedient Servant,

A. MCGILL,

Chief Analyst.

BULLETIN No. 252—

Date of Collection.	Nature of Sample.	No of Sample.	Name and Address of Vendor.	Cost.		Inspector's Report. (Is not an expression of opinion).
				Quantity.	Cents.	

DISTRICT OF NOVA SCOTIA—

1912.						
Sept.	Ground Cloves	46841	Wentzell's, Ltd., Halifax, N.S.	1 lb.	25	
" 13	"	46842	Jno. P. Mott & Co., Halifax, N.S.	"	nil.	
" 13	"	46843	Nat. Drug & Chem. Co., Halifax, N.S.	"	25	
" 16	"	46844	Morrison & Williams, Halifax, N.S.	"	22	
" 17	"	46845	Bauld Bros., Ltd., Halifax, N.S.	"	18	
" 17	"	46846	A. L. Doyle & Co., Halifax, N.S.	"	21	
" 17	"	46847	Jas. Scott & Co., Halifax, N.S.	"	30	
" 18	"	46848	R. B. Seaton & Co., Halifax, N.S.	"	24	
" 19	"	46849	W. H. Schwartz, & Sons, Halifax, N.S.	"	20	
Oct. 7	"	46850	Payzant & King, Halifax, N.S.	"	30	

DISTRICT OF PRINCE EDWARD ISLAND—

Sept.	6 Ground Cloves	46267	R. T. Maddigan & Co., Charlottetown, P.E.I.	1 lb.	30	
" 6	"	46268	J. G. Jamieson, Charlottetown, P.E.I.	"	48	
" 7	"	46269	A. Gates & Co., Charlottetown, P.E.I.	"	30	
" 9	"	46270	Coffin & Co., Charlottetown, P.E.I.	"	30	
" 10	"	46271	The 2 Mac's, Charlottetown, P.E.I.	"	30	
" 10	"	46272	The McKinnon Drug Co., Charlottetown, P.E.I.	"	40	
" 12	"	46273	W. W. Walker, Charlottetown, P.E.I.	"	30	
" 12	"	46274	J. G. Passmore, Charlottetown, P.E.I.	"	48	
" 14	"	46275	Reddin Bros., Charlottetown, P.E.I.	"	30	
" 17	"	46276	George Forbes, Vernon River Bridge.	"	24	

GROUND CLAVES.

Results of Analysis.										No. of Sample.	Remarks and Opinion of the Chief Analyst.
Ash.		Volatile matter at 100°C.			Fixed oil.	Total oil.	Tannin.	Crude Fibre.	Microscopical Examination.		
Total.	Acid Insoluble.	Moisture.	Oil.	Total.							

R. J. WAUGH, INSPECTOR.

p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.			
6.35	0.30	5.90	17.75	23.65	3.80	21.55	.....	.....	A few stems...	46841	Normal.
5.35	0.20	5.45	16.75	22.20	3.75	20.50	.....	.....	"	46842	"
5.80	0.15	5.85	16.05	22.80	3.85	20.80	.....	.....	A few stems and large amount of starch (Pimento).	46843	"
5.35	0.15	3.90	13.50	17.40	3.95	17.45	.....	.....	A few stems and starch (Pimento).	46844	Low in essential oil.
5.05	0.20	5.50	14.35	19.85	4.40	18.75	.....	.....	Stems and a little starch (Pimento).	46845	Normal.
5.90	0.20	4.90	13.95	18.75	4.20	18.15	.....	.....	Numerous stems.	46846	"
5.90	0.20	4.45	15.90	20.35	4.50	20.40	.....	.....	A few stems	46847	"
6.00	0.10	4.05	16.20	20.25	4.35	20.55	.....	.....	A few stems and a little starch (Pimento).	46848	"
5.60	0.20	4.25	17.95	22.20	4.65	22.60	.....	.....	Stems and starch (Pimento).	46849	"
6.00	0.15	4.05	17.75	21.80	4.45	22.20	.....	.....	Numerous stems and large amt. of starch (Pimento).	46850	"

WM. A. WEEKS, INSPECTOR.

5.90	0.20	6.55	14.80	21.35	2.85	17.65	.....	.....	A few stems...	46267	Normal.
5.60	0.20	6.05	18.10	24.15	3.25	21.35	.....	.....	"	46268	"
5.50	0.10	6.70	17.40	24.10	3.30	20.70	.....	.....	Starch (Pimento).	46269	"
6.00	0.25	6.75	15.95	22.70	3.20	19.15	.....	.....	Numerous stems and starch (Pimento).	46270	"
5.80	0.20	6.45	15.80	22.25	3.80	19.60	.....	.....	A few stems...	46271	"
5.55	0.15	6.85	13.35	20.20	3.55	16.90	.....	.....	A few stems and a little starch (Pimento).	46272	Low in essential oil.
5.25	0.15	7.20	12.20	19.40	3.60	15.80	.....	.....	Stems and starch (Pimento).	46273	"
6.30	0.50	7.20	14.40	21.60	2.85	17.25	.....	.....	A few stems, traces of starch (Pimento).	46274	Normal.
4.10	0.10	4.45	8.60	13.05	3.15	11.75	10.27	11.5	Large amt. of starch (Pimento).	46275	Very low in essential oil.
5.90	0.25	6.50	15.50	22.00	3.15	18.65	.....	.....	A few stems...	46276	Normal.

BULLETIN No. 252—

Date of Collection.	Nature of Sample.	No. of Sample.	Name and Address of Vendor.	Cost.		Inspector's Report. (Is not an expression of opinion).
				Quantity.	Cents.	

DISTRICT OF BRUNSWICK—

1912.						
Sept.	4	Ground Cloves.....	50440 Dearborn & Co., St. John, N.B.	$\frac{3}{4}$ lb..	18	
"	4	"	50441 Puddington, Wetmore & Morrison, Ltd., St. John, N.B.	$\frac{3}{4}$ " ..	21	
"	4	"	50442 G. E. Barbour Co., Ltd., St. John, N.B.	$\frac{3}{4}$ " ..	27	
"	5	"	50443 H. W. Cole, Ltd., St. John, N.B.	$\frac{3}{4}$ " ..	21	
"	5	"	50444 McCready & Son, Ltd., St. John, N.B.	$\frac{3}{4}$ " ..	18	
Oct.	8	"	50445 James Burgess & Son, Grand Falls, N.B.	3 pkgs	30	
"	8	"	50446 Jas. F. McCluskey, Grand Falls, N.B.	3 "	30	"Purity" Brand.....
"	15	"	50447 Mills, Eveliegh Co., Ltd., Sussex, N.B.	$\frac{3}{4}$ lb..	27	"Signet" Brand.....
"	16	"	50448 Mrs. P. White, Moncton, N.B.	3 pkgs	25	"Pyramid" Brand.....
"	19	"	50449 A. Normand Desbrisay, Bathurst, N.B.	$\frac{3}{4}$ lb..	30	

DISTRICT OF QUEBEC—

Sept.	3	Ground Cloves.....	37212 Eudore Delisle, 2 Ave Tache-reau, Quebec.	$\frac{3}{4}$ lb..	30	
"	4	"	37213 O. Lacroix, 19 Rue St. Joseph, Quebec.	$\frac{3}{4}$ " ..	30	
"	5	"	37214 W. Cantin, 133 Rue du Pont, Quebec.	$\frac{3}{4}$ " ..	30	
"	6	"	37215 G. Gingras, 268 Rue du Roi, Quebec.	$\frac{3}{4}$ " ..	30	
"	9	"	37216 Cantin & frere, 271 Rue St. Joseph.	$\frac{3}{4}$ " ..	30	
"	10	"	37217 C. S. Riverin, 50 Rue de la Couronne, Quebec.	$\frac{3}{4}$ " ..	30	

GROUND CLOVES.

Results of Analysis.										No. of Sample	Remarks and Opinion of the Chief Analyst.
Ash.		Volatile matter at 100°C.			Fixed oil.	Total oil.	Tannin.	Crude Fibre.	Microscopical Examination.		
Total.	Acid Insoluble.	Moisture.	Oil.	Total.							

J. C. FERGUSON, INSPECTOR.

p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.		
6.20	0.10	2.95	11.65	14.60	5.15	16.80	...	...	A few stems and a large amt. of starch(Pimento)	50440	Low in essential oil.
5.70	0.20	6.00	14.65	20.65	4.25	18.90	.....	.....	Numerous stems and a little starch(Pimento)	50441	Normal.
5.90	0.25	4.65	17.20	21.85	4.25	21.45	....	.....	A few stems....	50442	"
5.80	0.20	5.70	14.50	20.70	4.90	19.40	.....	.....	A few stems and a little starch (Pimento).	50443	"
6.05	0.20	2.85	12.25	15.10	3.50	15.75	.....	.....	A few stems and a little starch (Pimento).	50444	Low in essential oil.
6.50	0.20	3.20	11.00	14.20	4.45	15.45	.....	.....	Numerous stems and a large amt. of starch (Pimento).	50445	"
5.85	0.30	5.15	16.15	21.30	4.40	20.55	.....	.....	A few stems and a large amt. of starch(Pimento)	50446	Normal.
5.70	0.20	5.05	14.90	19.95	4.70	19.60	....	..	A few stems....	50447	"
6.25	0.20	3.80	9.10	12.90	4.60	13.70	15.11	11.5	Stems and starch (Pimento).	50448	Very low in essential oil.
6.05	0.15	4.00	10.30	14.30	4.85	15.25	18.13	11.5	Traces of starch (Pimento).	50449	"

F. X. W. E. BELAND, INSPECTOR.

5.40	0.45	4.15	9.60	13.75	6.35	15.95	9.67	11.5	A few stems and starch(Pimento)	37212	Very low in essential oil.
5.80	0.20	2.70	13.05	15.75	5.55	18.80	15.11	9.8	Numerous stems and starch (Pimento).	37213	Low in essential oil.
3.60	0.40	4.35	6.90	11.25	3.45	10.35	4.23	13.6	Stems and a large amt. of starch (Pimento).	37214	Very low in essential oil.
5.75	0.50	4.40	7.85	12.25	5.10	12.95	8.46	9.0	Starch (Pimento)	37215	"
3.70	0.20	3.30	7.30	10.60	5.60	12.90	5.44	17.7	Stems and a large amt. of starch (Pimento).	37216	"
3.90	0.15	4.35	6.95	11.30	4.50	11.45	6.04	21.2	Stems and starch (Pimento).	37217	"

BULLETIN No. 252—

Date of Collection.	Nature of Sample.	No. of Sample.	Name and Address of Vendor.	Cost.		Inspector's Report. (Is not an expression of opinion).
				Quantity.	Cents.	
DISTRICT OF QUEBEC—						
1912.						
Sept. 11	Ground Cloves	37218	Myrand & Pouliot, 70 Rue de la Couronne, Quebec.	3 lb..	30	.....
" 12	"	37219	Arthur Drolet, 714 Rue St. Valier, Quebec.	3 " ..	30	.....
" 13	"	37220	A. Rinfret, 414 Rue St. Valier, Quebec	3 " ..	30	.....
" 16	"	37221	Hamel & Bedard, 728 Rue St. Valer, Quebec.	3 " ..	30	.....
DISTRICT OF ST. HYACINTHE—						
Sept. 16	Ground Cloves	1454	Paul Rajotte, St. G. de Grantham.	2 lb..	30	.....
" 17	"	1455	Laperrière & fils, Pierreville...	2 " ..	19	.....
" 17	"	1456	J. E. Turbide, Yamaska East.	2 " ..	15	.....
" 18	"	1457	A. Casabon, Sorel.....	2 " ..	27	.....
" 20	"	1458	J. B. Carrean, St. Aime	2 " ..	15	.....
" 25	"	1459	L. Gosselin, Henryville. . .	2 " ..	28	.....
" 26	"	1460	W. A. Reynolds, Frelighsburg.	2 " ..	22	.....
" 27	"	1461	M. Lemire, Iberville.	2 " ..	20	.....
Oct. 1	"	1462	W. Murray & Co., Sherbrooke.	2 " ..	30	.....
" 8	"	1463	L. Minard, Eastman.....	2 " ..	25	.....
DISTRICT OF MONTREAL—						
Oct. 1	Ground Cloves	51001	J. H. Labraude, 141 St. Viateur st., Montreal.	1 lb..	30	.....
" 1	"	51002	H. Ward, 108 St. Viateur st., Montreal.	1 " ..	30	.....

GROUND CLOVES.

Results of Analysis.										No. of Sample.	Remarks and Opinion of the Chief Analyst.
Ash.		Volatile matter at 100°C.			Fixed oil.	Total oil.	Tannin.	Crude Fibre.	Microscopical Examination.		
Total.	Acid Insoluble.	Moisture.	Oil.	Total.							

Concluded.

p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.		
5.80	0.50	4.50	15.35	19.85	4.35	19.70	18.13	10.0	Stems and traces of starch (Pimento).	37218	Normal.
3.80	0.20	2.80	9.25	12.05	6.90	16.15	4.83	15.5	Stems and starch (Pimento).	37219	Very low in essential oil.
5.45	0.10	3.05	18.10	21.15	4.45	22.55	18.73	9.2	A few stems...	37220	Normal.
5.15	0.25	4.75	19.25	24.00	4.30	23.55	.....	.....	.....	37251	"

J. C. ROULEAU, INSPECTOR.

4.30	0.20	3.95	8.00	11.95	4.85	12.85	12.09	9.6	Stems and a large amount of starch (Pimento).	1454	Very low in essential oil.
4.55	0.20	3.60	11.60	15.20	5.55	17.15	.....	.....	A few stems and starch (Pimento).	1455	Low in essential oil
5.80	0.50	4.65	9.30	13.95	5.85	15.15	11.48	9.7	A few stems and a large amount of starch (Pimento).	1456	Very low in essential oil.
5.90	0.40	4.50	9.30	13.80	4.50	13.80	14.50	19.5	Stems and starch (Pimento).	1457	"
7.95	0.50	3.05	7.65	10.70	5.00	12.65	10.88	18.2	A few stems and a large amount of starch (Pimento).	1458	"
4.05	0.10	4.05	7.75	11.80	6.85	14.60	7.25	18.5	"	1459	"
5.80	0.30	4.95	14.70	19.65	4.35	19.05	.....	.....	"	1460	Normal.
5.50	0.35	5.15	18.95	24.10	4.70	23.65	.....	.....	Numerous stems.	1461	"
6.10	0.45	3.00	12.55	15.55	5.10	17.65	.....	.....	A few stems and a large amount of starch (Pimento).	1462	Low in essential oil.
6.60	0.35	4.25	13.55	17.80	4.75	18.30	.....	.....	A few stems and a little starch (Pimento).	1463	"

J. J. COSTIGAN, INSPECTOR.

3.65	0.35	4.00	8.75	13.35	5.35	14.10	9.06	10.8	Stems and a little starch (Pimento).	51001	Very low in essential oil.
6.20	0.50	6.35	15.35	21.70	3.00	18.35	.....	.....	Numerous stems.	51002	Normal.

BULLETIN No. 252—

Date of Collection.	Nature of Sample.	No. of Sample.	Name and Address of Vendor.	Cost.		Inspector's Report. (Is not an expression of opinion.)
				Quantity.	Cents.	

DISTRICT OF MONTREAL—

1912.						
Oct.	1	Ground Cloves.....	51003 E. Tessier, 70 Laurier ave. W., Montreal.	1 lb..	30	.....
"	4	"	51004 T. J. Collins, St. Agathe de Monts.	$\frac{3}{4}$ lb..	30	.....
"	7	"	51005 W. Bultcliffe, 350 Victoria ave., Westmount.	$\frac{3}{4}$ " ..	30	.....
"	8	"	51006 R. Bernard, 91 LaGauchetière st. E., Montreal.	$\frac{3}{4}$ " ..	30	.....
"	8	"	51007 S. Dionne, 140 Dorchester E., Montreal.	$\frac{3}{4}$ " ..	30	.....
"	10	"	51008 E. Dufour, Joliette, P.Q.	$\frac{3}{4}$ " ..	30	.....
"	16	"	51009 Z. Lapointe, 54 Villeneuve st., Montreal.	$\frac{3}{4}$ " ..	30	.....
"	11	"	51010 Lewis Reese, 393 Church ave., Verdun, P.Q.	$\frac{3}{4}$ " ..	30	.....

DISTRICT OF OTTAWA—

Aug.	30	Ground Cloves.....	50252 McCuaig, Cheney & Co., Vank- leek Hill.	$\frac{3}{4}$ lb..	30	Labelled pure ground cloves.
"	31	"	50253 A. Meighan & Bro., Perth, Ont.	3 pkts	30	Labelled pure ground cloves, A. Meighan & Bro., Perth, Ont.
Sept.	4	"	50254 A. S. Moreland, Ottawa.....	3 "	30	.....
"	4	"	50255 Geo. Agar, Ottawa.....	3 "	30	.....
"	4	"	50256 N. A. McCagg, Ottawa.....	3 "	30	.....
"	4	"	50257 Alex. Phillips, Ottawa.....	$\frac{3}{4}$ " ..	30	.....
"	5	"	50258 J. B. Bedard, Hull, P.Q.....	$\frac{3}{4}$ " ..	30	.....
"	6	"	50259 Jas. McDougall, Brockville...	$\frac{3}{4}$ " ..	30	.....
"	7	"	50260 John Whitley, Prescott.....	$\frac{3}{4}$ " ..	30	.....
"	18	"	50261 E. H. Tallman, Merrickville...	$\frac{3}{4}$ " ..	30	.....

GROUND CLOVES.

Results of Analysis.										No. of Sample.	Remarks and Opinion of the Chief Analyst.
Ash.		Volatile matter at 100° C.			Fixed oil.	Total oil.	Tannin.	Crude Fibre.	Microscopical Examination.		
Total.	Acid Insoluble.	Moisture.	Oil.	Total.							
Concluded.											
p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.			
4.60	0.15	6.75	11.35	18.10	4.80	16.15	...	.....	A few stems and starch (Pimento).	51003	Low in essential oil.
4.50	0.10	7.15	10.65	17.30	4.05	14.70	.....	.....	Stems and starch (Pimento).	51004	"
5.55	0.45	3.80	11.55	15.35	5.20	16.75	.....	.....	A few stems....	51005	"
4.90	0.20	3.75	8.50	12.25	3.70	12.20	10.88	12.0	A large amount of starch (Pimento).	51006	Very low in essential oil.
4.85	0.10	3.85	11.40	15.25	5.19	16.50	.....	.....	Stems and starch (Pimento).	51007	Low in essential oil.
4.55	0.10	3.75	12.80	16.55	6.75	19.55	.....	.....	" ..	51008	"
5.00	0.15	3.70	9.40	13.10	4.35	13.75	13.90	10.8	Stems and a large amount of starch (Pimento).	51009	Very low in essential oil.
5.00	0.20	4.10	12.25	16.35	6.20	18.45	.....	.....	" ..	51010	Low in essential oil.

J. A. RICKEY, INSPECTOR.

5.35	0.45	4.90	10.00	14.90	4.50	14.50	.....	.....	Stems and a large amt. of starch (Pimento).	50252	Low in essential oil.
5.50	0.20	6.35	16.80	23.15	3.10	19.90	.....	.....	A few stems....	50253	Normal.
5.45	0.20	6.35	16.70	23.05	3.20	19.90	.....	.....	A few stems and starch (Pimento).	50254	"
5.55	0.20	6.60	15.35	21.95	3.30	18.65	.....	.....	Stems and starch (Pimento).	50255	"
5.75	0.40	6.85	16.75	23.60	3.25	20.00	.....	.....	" ..	50256	"
5.45	0.60	6.50	11.50	18.00	2.90	14.40	.....	.....	" ..	50257	Low in essential oil; high in insoluble ash.
7.25	0.16	3.65	8.65	12.30	4.20	12.85	.....	.....	" ..	50258	Very low in essential oil.
6.70	0.25	2.30	12.50	15.40	3.40	15.90	16.92	10.8	Stems & a small amt. of starch (Pimento).	50259	Low in essential oil.
6.15	0.15	6.65	11.65	18.30	3.15	14.80	.....	.....	A few stems and a small amt. of starch (Pimento).	50260	"
6.55	0.40	6.40	11.30	18.20	3.20	14.50	.....	.....	Numerous stems	50261	"

BULLETIN No. 252—

Date of Collection.	Nature of Sample.	No. of Sample.	Name and Address of Vendor.	Cost.		Inspector's Report. (Is not an expression of opinion).
				Quantity.	Cents.	

DISTRICT OF KINGSTON—

1912.						
Sept.	3	Ground Cloves.....	50751 J. Campbell, Kingston.....	$\frac{1}{2}$ lb..	30	.....
"	9	"	50752 H. C. Hampton, Belleville....	$\frac{1}{2}$ " ..	30	.....
"	9	"	50753 S. R. Artia, Belleville.....	$\frac{1}{2}$ " ..	30	.....
"	9	"	50754 Wallbridge & Clark, Belleville.	$\frac{1}{2}$ " ..	30	.....
"	9	"	50755 C. Hilton, Belleville.....	$\frac{1}{2}$ " ..	30	.....
"	10	"	50756 The Thompson, Macdonald Co., Cobourg.	$\frac{1}{2}$ " ..	30	.....
"	10	"	50757 T. P. Harvey & Son, Cobourg..	$\frac{1}{2}$ " ..	30	.....
"	10	"	50758 W. D. Sephens, Port Hope....	$\frac{1}{2}$ " ..	35	.....
"	10	"	50759 F. Rosevear, Port Hope.....	$\frac{1}{2}$ " ..	30	.....
"	11	"	50760 J. Hill, Peterboro.....	$\frac{1}{2}$ " ..	30	.....

DISTRICT OF TORONTO—

Sept.	13	Ground Cloves.....	51441 T. H. Coffin, Grange ave. and Denison st., Toronto.	$\frac{1}{2}$ lb..	30	Vendor said it was in- cluded in stock when purchased.
"	16	"	51442 Wm. Black, 1960 Queen st. east, Toronto.	$\frac{1}{2}$ " ..	27	.....
"	16	"	51443 Fred Hammer, 581 King st. west, Toronto.	$\frac{1}{2}$ " ..	30	.....
"	17	"	51444 C. Barrett, 964 Bloor st. west. Toronto.	$\frac{1}{2}$ " ..	25	.....
"	17	"	51445 T. W. Cole, 156 Dundas st., Toronto.	$\frac{1}{2}$ " ..	20	.....
"	20	"	51446 Towns & Nonis, Aurora.....	$\frac{1}{2}$ " ..	30	.....
Oct.	2	"	51447 O. W. Robbins, 164 Locke st. south, Hamilton.	$\frac{1}{2}$ " ..	30	.....
"	2	"	51448 John Forth, Queen & Charlton ave., Hamilton.	$\frac{1}{2}$ " ..	30	.....

GROUND CLOVES.

Results of Analysis.										No. of Sample.	Remarks and Opinion of the Chief Analyst.
Ash.		Volatile matter at 100° C.			Fixed oil.	Total oil.	Tannin.	Crude Fibre.	Microscopical Examination.		
Total.	Acid Insoluble.	Moisture.	Oil.	Total.							

JAS. HOGAN, INSPECTOR.

p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.			
5.95	0.30	3.85	18.40	22.25	4.00	22.40	.....	.....	.....	.....	50751	Normal.
4.45	0.20	6.00	4.50	10.50	0.10	4.60	...	.....	Not cloves, All stems.	.....	50752	Is not cloves.
6.40	0.50	4.55	16.15	20.70	3.80	19.95	.....	.....	A few stems....	.....	50753	Normal.
6.95	0.45	4.50	14.00	18.50	3.40	17.40	.....	.....	"	.....	50754	"
7.40	0.35	3.10	14.40	17.50	4.65	19.05	15.11	9.6	"	.....	50755	"
6.05	0.20	3.90	19.80	23.60	3.70	23.50	...	.....	"	.....	50756	"
5.30	0.15	3.10	21.10	24.60	4.40	25.50	...	.....	A few stems and a little starch (Pimento).	.....	50757	"
5.60	0.20	3.40	21.75	25.15	4.45	26.20	.....	.....	"	.....	50758	"
5.80	0.25	4.40	15.30	19.70	4.00	19.30	.....	.....	A few stems and starch (Pimento).	.....	50759	"
6.40	0.40	4.00	18.65	22.65	4.30	22.95	.....	.....	"	.....	50760	"

H. J. DAGER, INSPECTOR.

4.95	0.15	4.70	9.65	14.5	3.10	12.75	10.27	15.0	Numerous stems and a large amt. of starch (Pimento).	51441	Very low in essential oil.
6.95	0.60	6.45	13.55	20.00	2.85	18.40	.....	.....	Stems	51442	Low in essential oil; high insoluble ash
7.25	0.50	6.30	11.90	18.20	4.15	16.05	.....	.....	A small amt. of starch (Pimento).	51443	Low in essential oil.
6.40	0.30	6.65	12.80	19.45	2.70	15.50	...	.....	Stems and a large amt. of starch (Pimento).	51444	"
6.65	0.45	4.25	8.65	12.90	2.80	11.45	12.69	15.8	"	51445	Very low in essential oil.
6.75	0.20	6.75	12.15	18.90	2.70	14.85	.....	.....	Stems.....	51446	Low in essential oil.
5.20	0.45	3.50	11.45	14.95	5.25	16.70	.....	.....	"	51447	"
5.35	0.25	5.85	16.60	22.45	4.80	21.40	...	.....	Stems and traces of starch (Pimento).	51448	Normal.

BULLETIN No. 252—

Date of Collection.	Nature of Sample.	No. of Sample.	Name and Address of Vendor.	Cost.		Inspector's Report. (Is not an expression of opinion.)
				Quantity.	Cents.	

DISTRICT OF TORONTO—

1912						
Oct.	3	Ground Cloves.....	51449 J. J. Lynch, 185 Park st., Hamilton.	$\frac{3}{4}$ lb.	23	
"	3	"	51450 R. D. Saul, 124 James st. north, Hamilton.	$\frac{3}{4}$ "	23	

DISTRICT OF WINDSOR—

Oct.	2	Ground Cloves.....	48152 A. Duncan & Co., Wyoming..	$\frac{3}{4}$ lb..	30	
"	3	"	48162 R. Wanless & Co., Sarnia....	$\frac{3}{4}$ "	30	Todhunter's pure select cloves.
"	4	"	48171 R. H. Davis, Strathroy.....	$\frac{3}{4}$ "	60	
"	7	"	48174 G. A. Curtis, Simcoe.....	$\frac{3}{4}$ "	60	
"	7	"	48176 R. Edmunds, Simcoe.....	$\frac{3}{4}$ "	45	
"	7	"	48178 Oscar R. Hauselman, Simcoe..	$\frac{3}{4}$ "	38	
"	7	"	48179 G. J. Imeson, Simcoe.....	$\frac{3}{4}$ "	30	
"	7	"	48182 L. F. Aiken, Simcoe.....	$\frac{3}{4}$ "	45	
"	7	"	48184 G. O. Werrett, Simcoe.....	$\frac{3}{4}$ "	45	
"	8	"	48186 Ray P. Colburn, Tillsonburg..	$\frac{3}{4}$ "	30	
"	8	"	48188 Imrie & Stewardson, Tillson- burg.	$\frac{3}{4}$ "	30	

DISTRICT OF MANITOBA—

Sept.	17	Ground Cloves.....	48701 R. Seymour, Sargent ave., Winnipeg.	$\frac{3}{4}$ lb..	30	
"	17	"	48702 MacKenzie & Reeve, Winni- peg.	$\frac{3}{4}$ "	30	

GROUND CLOVES.

Results of Analysis.										No. of Sample.	Remarks and Opinion of the Chief Analyst.
Ash.		Volatile matter at 100° C.			Fixed oil.	Total oil.	Tannin.	Crude Fibre.	Microscopical Examination.		
Total.	Acid Insoluble.	Moisture.	Oil.	Total.							

Concluded.

p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.			
6.25	0.20	5.10	19.10	24.20	4.50	23.60	.....	.....	A few stems ...	51449	Normal.	
5.80	0.50	5.00	18.80	23.80	5.30	24.10	.....	..	A few stems and traces of starch (Pimento).	51450	"	

JNO. TALBOT, INSPECTOR.

5.35	0.10	4.75	16.85	21.60	4.25	21.10	.....	.....	Stems and a large amt. of starch (Pimento).	48162	Normal.	
4.70	0.20	5.40	19.80	25.30	4.15	23.95	.....	.....	Starch (Pimento).	48162	"	
6.10	0.15	4.50	14.30	18.80	3.00	17.90	.....	.....	A few stems and a little starch (Pimento).	48171	"	
5.90	0.20	4.10	15.90	20.00	4.30	20.20	.....	.....	Numerous stems and a large amt. of starch (Pimento).	48174	"	
6.95	0.40	4.65	11.55	16.20	4.25	15.80	.....	.....	Numerous stems	48176	Low in essential oil.	
4.65	0.15	4.75	20.15	24.90	4.10	24.25	.....	.....	A few stems....	48178	Normal.	
4.65	0.10	3.85	17.75	21.60	4.40	22.15	.....	.....	A few stems and a large amt. of starch (Pimento).	48179	"	
5.35	0.20	4.20	16.60	20.80	4.55	21.15	.....	.....	A few stems and a little starch (Pimento).	48182	"	
5.60	0.30	3.70	18.50	22.20	4.30	22.70	.....	.....	"	48184	"	
4.80	0.30	3.20	10.65	13.85	5.35	16.00	.....	.....	Stems and a large amt. of starch (Pimento).	48186	Low in essential oil.	
4.90	0.10	4.10	15.65	19.75	5.80	21.45	.....	.....	A few stems and starch (Pimento).	48188	Normal.	

A. C. LARIVIÈRE, INSPECTOR.

5.55	0.15	6.35	18.45	24.80	2.70	21.15	.....	.....	A few stems ...	48701	Normal.	
6.65	0.40	3.65	13.45	17.10	3.40	16.85	21.15	9.7	"	48702	Low in essential oil.	

BULLETIN No. 252—

Date of Collection.	Nature of Sample.	No. of Sample.	Name and Address of Vendor.	Cost.		Inspector's Report. (Is not an expression of opinion).
				Quantity.	Cents.	

DISTRICT OF MANITOBA—

1912.						
Sept. 17	Ground Cloves...	48703	Conley & Yost, Winnipeg....	½ lb..	30	.....
" 19	"	48704	C. A. Whitman, Emerson....	½ "	20	.....
" 20	"	48705	Campbell Bros. & Wilson, Win- nipeg.	3 tins.	nil	.....
" 20	"	48706	The Dyson Co., Winnipeg....	½ "	"	.....
" 20	"	48707	White Star Mfg. Co., Winni- peg.	3 tins.	"	.....
" 20	"	48708	Gold Standard Mfg. Co., Win- nipeg.	½ lb..	"	.....
" 23	"	48709	P. Nelson, Winnipeg....	3 tins.	30	.....
" 23	"	48710	W. H. Morgan, Winnipeg....	½ lb..	30	.....

DISTRICT OF NELSON—

Sept. 3	Ground Cloves...	49688	Union Cash Grocery, Nelson, B.C.	3 tins.	40	.....
" 3	"	49691	Bell Trading Co., Nelson, B.C.	½ lb..	30	.....
" 6	"	49708	G. B. Armstrong, Merritt, B.C.	3 tins.	45	.....
" 6	"	49708	Merritt Merc. Co., Merritt, B.C.	½ lb..	30	.....
" 6	"	49714	Merritt Ind. & Co-op. Society, Merritt, B.C.	3 tins.	30	.....
" 9	"	49723	L. C. Masson, Revelstoke, B.C.	3 "	45	.....
" 9	"	49727	Bourne Bros., Revelstoke, B.C.	½ lb..	40	.....
" 23	"	49749	C. A. Warren, Golden, B.C....	3 tins.	40	.....
" 23	"	49756	H. G. Parson, Ltd., Golden, B.C.	3 "	30	.....
" 23	"	49761	C. R. Lumber Co., Golden, B.C.	3 "	45	.....

GROUND CLOVES.

Results of Analysis.										No. of Sample.	Remarks and Opinion of the Chief Analyst.
Ash.		Volatile matter at 100°C.			Fixed oil.	Total oil.	Tannin.	Crude Fibre.	Microscopical Examination.		
Total.	Acid Insoluble.	Moisture.	Oil.	Total.							
Concluded.											
p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.		
7.70	0.80	3.85	10.70	14.55	6.10	16.80	.....	...	A few stems and a small amount of starch (Pimento).	48703	Low in essential oil, high insoluble ash
7.15	0.30	6.40	19.10	25.50	2.85	21.95	.....	.....	" "	48704	Normal.
4.90	0.25	6.15	21.35	27.50	3.75	25.10	16.92	8.9	Stems.....	48705	"
5.15	0.20	5.70	12.75	18.45	4.35	17.10	.....	.....	A few stems....	48706	Low in essential oil.
5.60	0.10	6.45	14.40	20.95	3.10	17.50	.....	.....	" .....	48707	Normal.
5.60	0.10	5.10	20.15	25.25	3.35	23.30	.....	.....	" .....	48708	"
7.45	0.60	3.50	13.55	17.05	6.15	19.70	.....	.....	A few stems and starch(Pimento)	48709	Low in essential oil, high insoluble ash
5.75	0.10	6.00	14.05	20.05	3.45	17.50	.....	.....	Stems and traces of starch (Pimento).	48710	Normal.
THOS. PARKER, INSPECTOR.											
6.50	0.20	4.20	12.30	16.50	4.40	16.70	.....	.....	Stems.....	49688	Low in essential oil.
4.80	0.10	4.30	18.60	22.90	4.85	23.45	.....	.....	A few stems and a little starch (Pimento).	49691	Normal.
5.75	0.35	4.30	15.90	20.20	5.60	21.50	.....	.....	" "	49703	"
*	*	*	*	*	*	*	*	*		49708	Sample lost.
4.75	0.20	4.55	21.50	26.05	5.45	26.95	.....	.....	Traces of starch (Pimento).	49714	Normal.
5.30	0.30	5.45	19.25	25.80	5.10	24.35	.....	.....	A few stems and a little starch (Pimento).	49722	"
3.25	0.10	4.65	10.50	15.10	4.25	14.75	6.65	.....	Stems and a very large amount of starch (Pimento).	49727	Low in essential oil.
5.30	0.20	4.85	19.10	23.95	6.20	25.30	.....	.....	A few stems....	49748	Normal.
5.25	0.25	5.30	20.20	25.50	3.85	21.05	16.92	8.2	A few stems and a little starch (Pimento).	49756	"
6.70	0.40	4.45	12.65	17.10	4.10	16.75	.....	.....	Stems and a little starch (Pimento)	49751	Low in essential oil,

* Sample destroyed in transit.

Date of Collection.	Nature of Sample.	No. of Sample.	Name and Address of Vendor.	Cost.		Inspector's Report. (Is not an expression of opinion).
				Quantity.	Cents.	

DISTRICT OF VANCOUVER—

1912.						
Sept. 20	Ground Cloves.....	38419	London Grocery Co., Granville St. Vancouver, B.C.	3 tins.	20	This Tin contains nothing but spice of the finest quality.
" 20	"	38420	Jardine & Dickinson, Kerrisdale, B.C.	3 "	25	Guaranteed absolutely pure.
" 20	"	38421	A. C. Bartig, 8th Ave. & Granville St., Vancouver, B.C.	1 lb.	30	.....
" 20	"	38422	Merilees Grocery, 2640 Main St., Vancouver, B.C.	3 tins.	25	.....
" 20	"	38423	Efford Bros., 244 Broadway E., Vancouver, B.C.	1 lb.	30	.....
" 21	"	38424	Kelly's Grocery, 2333 Main St., Vancouver, B.C.	1 "	30	.....
" 23	"	38425	F. Filion, Carral St., Vancouver, B.C.	1 "	30	.....
" 23	"	38426	F. Ayling, Cedar Cottage, Vancouver, B.C.	1 "	30	.....
" 23	"	38427	Lyons Grocery, Commercial Drive Vancouver, B.C.	3 tins.	45	Guaranteed to be the finest quality and full strength.
" 23	"	38428	J. Main, Commercial Drive, Vancouver, B.C.	1 lb.	30	.....

DISTRICT OF VICTORIA—

Sept. 10	Ground Cloves. ...	49178	Windsor Grocery Co., 817 Douglas St., Victoria, B.C.	3 tins.	30	.....
" 11	"	49179	The West End Grocery Co., Ltd., 1002 Government St., Victoria, B.C.	3 "	30	"Empress" Brand.
12	"	49180	Copas & Young, 631 Fort St., Victoria, B.C.	3 "	25	Anti-Combine Brand.

GROUND CLOVES.

Results of Analysis.										No. of Sample.	Remarks and Opinion of the Chief Analyst.
Ash.		Volatile matter at 100° C.			Fixed oil.	Total oil.	Tannin.	Crude Fibre.	Microscopical Examination.		
Total.	Acid Insoluble.	Moisture.	Oil.	Total.							

J. F. POWER, INSPECTOR.

p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.			
5.85	0.30	5.10	16.00	21.10	4.65	20.65	.....	.....		Stems and a little starch. (Pi-mento).	38419	Normal.
4.50	0.15	4.30	21.70	26.00	4.05	25.75	.....	.....		A few stems and starch. (Pi-mento).	38420	"
5.06	0.20	5.48	12.25	17.70	4.75	17.00	.....	.....		A large amount of starch.)Pi-mento).	38421	Low in Essential oil.
4.90	0.20	4.95	21.35	26.30	4.00	25.35	18.73	8.0		A few stems and traces of starch. (Pimento).	38422	Normal.
5.20	0.20	3.65	12.85	16.50	5.05	17.90	.....	.....		Starch. (Pimen- to).	38423	Low in Essential oil.
5.65	0.25	4.15	13.20	17.35	4.80	18.00	.....	.....		A large amount of starch. (Pi-mento).	38424	"
6.45	0.20	4.70	13.15	17.85	4.70	17.85	.....	..		A few stems and a large amount of starch. (Pi-mento).	38425	"
5.60	0.15	5.40	18.00	23.40	4.25	22.25	.....	.....		"	38426	Normal.
5.10	0.20	5.10	22.50	27.60	3.90	26.40	...	.....		A few stems ...	38427	"
5.90	0.40	5.25	15.50	20.75	4.40	19.90	.....	.....		A few stems and starch. (Pi-mento).	38428	"

D. OSULIVAN, INSPECTOR.

5.05	0.20	6.10	14.65	20.75	4.60	19.25	.....	.....	A few stems and starch. (Pi- mento).	49178	Normal.
5.35	0.10	5.40	19.30	24.70	4.05	23.35	.....	.....	A few stems and a large amount of starch. (Pi- mento).	49179	"
6.00	0.60	6.60	16.75	23.35	3.80	20.55	.....	.....	Numerous stems and a little starch. (Pi- mento).	49180	Normal—except as to insoluble ash.

BULLETIN No. 252—

Date of Collection.	Nature of Sample.	No. of Sample.	Name and Address of Vendor.	Cost.		Inspector's Report. (Is not an expression of opinion).
				Quality.	Cents.	

DISTRICT OF VICTORIA—

1912.						
Sept. 16	Ground Cloves.....	49181	Acton Bros., 1317 Douglas St., Victoria, B.C.	3 tins.	30	"Empress" Brand.....
" 16	"	49182	H. & K. Grocery, Victoria, B.C.	3 lb.	30	"
" 19	"	49183	Harrison & McDonald, 1218 Douglas St., Victoria, B.C.	2 lb...	30	"
" 20	"	49184	F. E. Plummer, 1118 Sunda St., Victoria, B.C.	3 tins.	30	"St. James" Brand.....
" 25	"	49185	Erskine & Co., 861 Johnston St., Victoria, B.C.	3 "	30	"Victoria" Brand.....
Oct. 15	"	49186	Henry W. Driver, 856 Yates St., Victoria, B.C.	3 "	30	"Gauntlet" Brand.....
" 15	"	49187	W. A. Jameson Coffee Co., 754 Broughton St., Victoria, B.C.	2 lb...	30	"

GROUND CLOVES.

Results of Analysis										No. of Sample.	Remarks and Opinion of the Chief Analyst.
Ash.		Volatile matter at 100°C.			Fixed oil.	Total oil.	Tannin.	Crude Fibre.	Microscopical Examination.		
Total.	Acid Insoluble.	Moisture.	Moisture <i>p.c.</i>	Total.							

Concluded.

p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.	p.c.			
5.40	0.20	6.15	18.75	24.90	3.75	22.50	.....	.....	A few stems and a little starch. (Pimento).	49181	Normal.
5.50	0.20	6.20	18.25	24.45	3.90	22.15	.	.....	Numerous stems and a little starch. (Pimento).	49182	"
5.30	0.30	5.90	15.40	21.30	3.95	19.35	..	.....	Starch. (Pimento).	49183	"
5.00	0.15	5.65	19.10	24.75	4.10	13.20	.....	.....	A few stems and a little starch. (Pimento).	49184	"
5.10	0.30	6.10	14.35	20.45	4.40	18.75	.....	.....	Stems and starch (Pimento).	49185	"
5.10	0.20	6.45	19.60	26.05	3.70	23.30	.....	.....	A few stems and traces of starch (Pimento).	49186	"
6.75	0.35	3.60	13.80	17.40	5.10	18.60	.....	.....	Numerous stems and starch. (Pimento).	49187	Low in Essential oil.